

REMARKS

The Office Action mailed July 3, 2002, has been received and reviewed. Claims 1 through 23 and 36 through 49 are currently pending in the application. All pending claims stand rejected. Reconsideration of the application is respectfully requested in view of the following remarks.

35 U.S.C. § 102(e) Anticipation Rejections

(A) Applicable Authority

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

(B) Anticipation Rejection Based on U.S. Patent No. 6,046,910 to Ghaem et al.

Claims 1 through 5, 10, 14 through 17, 36, 38, and 40 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,046,910 to Ghaem et al. (hereinafter the "Ghaem reference"). As the Ghaem reference fails to describe, either expressly or inherently, each and every element of the rejected claims, Applicants respectfully traverse this rejection.

Independent claim 1 of the above-referenced application recites a method of forming a flip-chip semiconductor die comprising providing at least one flip-chip semiconductor die having an active surface and forming at least one stabilizer comprising a dielectric material and securing said at least one stabilizer to the active surface so as to protrude from the active surface. The at least one stabilizer is configured to at least partially stabilize an orientation of the at least one flip-chip semiconductor die when disposed face down over a higher level substrate.

Independent claim 36 of the above-referenced application recites a method of fabricating a semiconductor device component comprising providing at least one semiconductor substrate

with contact pads on an active surface thereof and sequentially forming on the active surface at least one stabilizer. The stabilizer has a plurality of superimposed, contiguous, mutually adhered layers of photopolymer and is configured to at least partially stabilize an orientation of the semiconductor device component upon being disposed face down over a higher level substrate.

By way of contrast, the Ghaem reference describes an integrated circuit component 20 having bond pads 26 and conductive members 32, 44 in slidable communication with terminals 48 on a substrate 46 (see FIGs. 1 and 7 and col. 5, lines 6-11). Integrated circuit component 20 is attached to substrate 46 via polymeric bodies 50, which hold conductive members 32, 44 in compressive communication with terminals 48 (see col. 6, lines 36-65 and col. 7, lines 1-18). In some embodiments, polymeric preforms 40 are placed on substrate 46 or integrated circuit component 20 to restrict the flow of a polymeric precursor of bodies 50 into the area between substrate 46 and integrated circuit component 20 (see col. 5, line 66 – col. 6, line 13). The polymeric preforms 40 are preferably formed of compressible material which does not significantly interfere with the shrinkage of polymeric bodies 50 (see col. 6, lines 14-17).

It is respectfully submitted that the Ghaem reference does not describe, either expressly or inherently, each and every element of independent claims 1 and 36. The polymeric preforms 40 of the Ghaem reference are not for the purpose of stabilizing and thus are not stabilizers as that term is utilized in the present application. Rather, the preforms 40 of the Ghaem reference merely act as flow restrictors that prevent under-fill by the material of the polymeric bodies 50. This is evidenced by the fact that the polymeric preforms 40 are “preferably composed of a compressible material which does not significantly interfere with the shrinkage of the polymeric bodies 50 during curing, cooling, or cross-linking” and, thus, which permit movement of an integrated circuit component 20 toward a substrate 40 (col. 6, lines 14-20). Stated another way, the polymeric preforms 40 of the Ghaem reference do not support the integrated circuit component 20. Also, the Ghaem reference describes that the polymeric preforms 40 are not even necessary if the polymeric bodies 50 are viscous and will not substantially flow during application (see col. 8, lines 39-43).

Accordingly, applicants respectfully submit that the Ghaem reference fails to describe, either expressly or inherently, each and every element of independent claims 1 and 36 of the above-referenced application. As such, applicant respectfully requests withdrawal of the § 102(e) rejection of these claims. Further, claims 2 through 5, 10, 14 through 17, 38 and 40 each depend, either directly or indirectly from one of claims 1 and 36 and, thus, applicant respectfully requests withdrawal of the § 102(e) rejection of these claims as well for at least the above-stated reasons.

Claim 3 is additionally believed to be in condition for allowance because the Ghaem reference does not describe “forming at least one stabilizer of said plurality of stabilizers adjacent at least one corner of said active surface” of a semiconductor die. Instead, the Ghaem reference teaches placing a polymeric preform 40 adjacent to a corner of an active surface.

Claim 4 is additionally believed to be in condition for allowance as the Ghaem reference does not describe “forming at least two stabilizers adjacent opposite peripheral edges of said active surface” of a semiconductor die. Again, the Ghaem reference instead teaches placing a polymeric preform 40 adjacent to a corner of an active surface.

Claim 5 is additionally believed to be in condition for allowance because the Ghaem reference does not describe “forming selected ones of said plurality of stabilizers to have a height that defines a substantially consistent die-to-substrate distance”. The “die-to-substrate distance” is not described at all in the Ghaem reference.

Claims 1 through 5, 10, 14 through 17, 36, 38 and 40 are believed to be in condition for allowance and such favorable action is respectfully requested.

35 U.S.C. § 103(a) Obviousness Rejections

(A) Applicable Authority

The basic requirements of a *prima facie* case of obviousness are summarized in MPEP §2143 through §2143.03, *i.e.*, in order “to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references

themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success in combining the references. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the expectation of success must both be found in the prior art, and not based on Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Further, in establishing a *prima facie* case of obviousness the initial burden is placed on the examiner. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). See also MPEP § 706.02(j) and §2142.

The Supreme Court has established the standard of patentability to be applied in obviousness rejections in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). This standard has been summarized in MPEP § 2141 into four factual inquiries including "(A) determining of the scope and contents of the prior art; (B) ascertaining the differences between the prior art and the claims in issue; (C) resolving the level of ordinary skill in the pertinent art; and (D) evaluating evidence of secondary considerations." It should be noted that, when applying the required patentability standards of *Graham*, the basic considerations which apply to obviousness rejections based on 35 U.S.C. § 103 should include the following principles of patent law: "(A) the claimed invention must be considered as a whole; (B) the references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (C) the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and (D) reasonable expectation of success is the standard with which obviousness is determined." *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

C

(B) Obviousness Rejection Based on U.S. Patent No. 6,046,910 to Ghaem et al.

Claims 9, 11 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ghaem reference, as applied to claims 1 through 5 above.

Claims 9, 11 and 12 are believed to be in condition for allowance, among other reasons, as depending from claim 1 (discussed hereinabove) which is in condition for allowance. Claims 9, 11 and 12 are additionally believed to be in condition for allowance as the Ghaem reference does not teach or suggest all of the limitations of these claims, even in combination with those elements for which Official Notice has been taken. In particular, the Ghaem reference fails to teach or suggest a stabilizer as that term is utilized in the present application but rather discloses flow restrictors formed of a compressible material.

Claim 11 is additionally believed to be in condition for allowance as the Ghaem reference fails to teach or suggest “applying a layer of insulative material on said active surface and patterning said layer.” The Ghaem reference lacks any teaching or suggestion of patterning a polymer on an active surface at all.

Claim 12 is additionally believed to be in condition for allowance as the Ghaem reference does not teach or suggest “applying a layer of photoresist material on said active surface and patterning said layer.”

Accordingly, withdrawal of the obviousness rejections of claims 9, 11 and 12 under 35 U.S.C. § 103 is respectfully requested. Claims 9, 11 and 12 are believed to be in condition for allowance and such favorable action is respectfully requested.

(C) Obviousness Rejection Based on U.S. Patent No. 6,046,910 to Ghaem et al. and Further in View of U.S. Patent No. 5,264,061 to Juskey et al. and U.S. Patent No. 4,575,330 to Hull

Claims 6, 7, 18, 19, 23, 41 through 45 and 47 through 49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ghaem reference, as applied to claims 1 through 5, 9, 10, and 14 through 17 above, and further in view of U.S. Patent No. 5,264,061 to Juskey et al.

(hereinafter the "Juskey reference") and U.S. Patent No. 4,575,330 to Hull (hereinafter the "Hull reference"). As the Examiner has failed to make out a *prima facie* case of obviousness based upon the cited references, applicants respectfully traverse this rejection.

Claims 6 and 7 are both believed to be in condition for allowance, among other reasons, as depending, either directly or indirectly, from claim 1 (discussed hereinabove) which is in condition for allowance. Additionally, it is respectfully submitted that a *prima facie* case of obviousness cannot be made out based upon the cited references as there is no suggestion or motivation to combine the references in the manner presented, as more fully described below. Further, the cited references fail to teach or suggest each of the elements of independent claim 1, from which claims 6 and 7 depend, either directly or indirectly. Specifically, the Ghaem reference fails to teach or suggest a stabilizer as that term is utilized in the present application but rather discloses flow restrictors formed of a compressible material. The Juskey reference and the Hull reference fail to alleviate this deficiency. The respective teachings of the Juskey reference and the Hull reference are discussed hereinbelow.

For the sake of convenience, the independent claims to which the above rejection applies are summarized herein. Independent claim 1 was discussed previously herein. Independent claim 18 recites a method of fabricating a semiconductor device component comprising providing at least one semiconductor substrate with contact pads on an active surface thereof and sequentially forming on said active surface at least one stabilizer having a plurality of superimposed, contiguous, mutually adhered layers of photopolymer. The at least one stabilizer is configured to at least partially stabilize an orientation of the semiconductor device component upon being disposed face down over a higher level substrate.

Independent claim 19 recites a method of fabricating a semiconductor device component comprising placing at least one semiconductor substrate having an active surface with contact pads exposed thereon in a horizontal plane, recognizing a location and orientation of the at least one substrate, and stereolithographically forming on the active surface at least one stabilizer comprising at least one layer of an electrically nonconductive semisolid material. The stabilizer

is formed between one of the contact pads and a peripheral edge of the at least one substrate.

Independent claim 41 recites a method of forming a flip-chip semiconductor die comprising providing at least one flip-chip semiconductor die having an active surface with contact pads exposed thereon, applying a layer of a partially uncured photopolymer to the flip-chip semiconductor and stereolithographically forming on the flip-chip semiconductor at least one stabilizer securable to the active surface so as to protrude from the active surface. The at least one stabilizer is a structure configured to at least partially stabilize an orientation of the at least one flip-chip semiconductor die when disposed face down over a higher level substrate.

It is respectfully submitted that a *prima facie* case of obviousness of independent claims 18, 19 and 41 cannot be made based upon the cited references. The Ghaem reference was described hereinabove. The Juskey reference discloses a method of making a three-dimensional printed circuit assembly by forming successive adjacent layers of an object using stereolithography. A substrate is first formed from a photoactive polymer that is capable of altering its physical state when exposed to a radiant beam. At this point, the substrate is only partially cured. A conductive circuit pattern is formed on the partially cured substrate and the substrate is then molded to create a three-dimensional structure. The substrate is then further cured to cause the photoactive polymer to harden completely (see col. 1, lines 54-63 and col. 2, lines 30-52).

The Hull reference discloses an apparatus for production of three dimensional objects by stereolithography. The discussion of the Hull reference is directed to simplified means for rapid prototyping of parts to allow quickly and economically moving from a design stage to production (see col. 1, line 63 – col. 2, line 12).

Applicants respectfully submit that there is no suggestion or motivation in the cited references or from the knowledge generally available in the prior art which would lead one of ordinary skill in the art to modify the Ghaem reference with the teachings of the Juskey reference and the Hull reference, as alleged in the outstanding Office Action. First, there is no disclosure in the Hull reference describing fabrication of features on semiconductor dice. Rather, the Hull

reference envisions providing prototypes by creating an entire assembly using stereolithography.

Regarding the Ghaem reference, as previously discussed, the polymeric preforms 40 disclosed therein are not formed on the semiconductor die but, rather, are preformed and placed adjacent to a corner of an active surface. Further, the polymeric preforms 40 are not for the purpose of stabilizing, but act as flow restrictors that prevent under-fill by polymeric bodies 50. This is evidenced by the fact that the polymeric preforms 40 are not even necessary if the polymeric bodies 50 are viscous and will not substantially flow during application (see col. 8, lines 39-43). Even if the polymeric preforms 40 could be characterized as stabilizers, stereolithographically formed stabilizers would not reduce any risk of short circuiting in the Ghaem reference. Conductive members 32, 44 are uniquely formed to be in slidable communication with terminals 48 and are not attached to the substrate in such a way as to cause shorting problems.

As for the Juskey reference, there is no teaching or suggestion that the described techniques of making a three-dimensional printed circuit assembly would be useful for fabricating features on semiconductor dice. The teachings of the Juskey reference are limited to the fabrication of circuit boards.

Accordingly, applicants respectfully submit that there would be no motivation to one of ordinary skill in the art to combine the Ghaem reference, the Juskey reference and the Hull references in such a way as to render obvious the use of stereolithography or other layered manufacturing techniques to form stabilizers on semiconductor dice. "Before the PTO may combine the disclosures of two or more prior art references in order to establish *prima facie* obviousness, **there must be some suggestion for doing so . . .**" *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598-99 (Fed. Cir. 1988) (Emphasis added). "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Gordon*, 733 F.2d at 902, 221 USPQ at 1127 (Fed. Cir. 1984)

Further, the Ghaem reference teaches away from the asserted combination. As previously discussed, the polymeric preforms 40 of the Ghaem reference are “preferably composed of a compressible material which does not significantly interfere with shrinkage of the polymeric bodies 50 during curing, cooling, or cross-linking” and, thus, which permit movement of an integrated circuit component 20 toward a substrate 40 (col. 6, lines 14-20). Stated another way, the polymeric preforms 40 of the Ghaem reference do not support the integrated circuit component 20. The polymeric preforms 40 are formed of a compressible material so that the polymeric bodies 50 can shrink and urge conductive members 32, 44 into contact with the terminals 48 (see col. 7, lines 15-19). This allows the conductive members 32, 44 to be slidable while maintaining good electrical contact. A rigid stereolithographically formed preform 40 would interfere with this type of electrical contact, and goes directly against the whole purpose of the Ghaem reference disclosure.

In view of the foregoing, applicants respectfully submit that the cited references fail to establish a *prima facie* case of obviousness of claims 6, 7, 18, 19 and 41. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 103 of claims 6, 7, 18, 19 and 41 based upon the Ghaem, Juskey and Hull references be withdrawn. It is respectfully requested that the rejections of claims 23, 42 through 45 and 47 through 49, which depend either directly or indirectly from one of claims 19 and 41, be withdrawn as well for at least the above-stated reasons. Each of claims 6, 7, 18, 19, 23, 41 through 45, and 47 through 49 are believed to be in condition for allowance and such favorable action is respectfully requested.

(D) Obviousness Rejection Based on U.S. Patent No. 6,046,910 to Ghaem et al. in View of U.S. Patent No. 5,264,061 to Juskey et al. and U.S. Patent No. 4,575,330 to Hull and Further in View of U.S. Patent No. 5,870,220 to Migdal

Claims 20 through 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ghaem reference in view of the Juskey reference and the Hull reference, as applied to claims 18 and 19 above, and further in view of U.S. Patent No. 5,870,220 to Migdal (hereinafter the “Migdal reference”). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claims 20 through 22 are believed to be in condition for allowance, among other reasons as depending from claim 19 which is believed to be in condition for allowance. Additionally, it is respectfully submitted that the Examiner has failed to make out a *prima facie* case of obviousness of claims 20 through 22 based upon the combination of references presented herein.

The Ghaem reference, the Juskey reference and the Hull reference are discussed hereinabove. The Migdal reference relates generally to three-dimensional (3D) scanning and measuring systems, and relates particularly to a portable 3D scanning system and method which facilitate acquisition and storage of data relating to 3D profiles of objects for subsequent computer-aided data processing and reproduction of the 3D profiles of the objects by shape digitizing and adaptive mesh generation (see col. 1, lines 6-12). The Migdal reference is relied upon for its disclosure of a machine vision system to recognize the location and orientation of a substrate or object and store physical parameters of the object in conjunction with a stereolithographic process (see Office Action, page 5, ¶2). However, contrary to this characterization, the Migdal reference does not teach or suggest use of the machine vision system in conjunction with a stereolithography system to identify the location of an object, such as a semiconductor die, at which structures, such as stabilizers, are to be formed. Reference to stereolithography was only made once in the entire patent to illustrate an application of the scanning system taught and disclosed (see col. 4, line 15).

Accordingly, applicants respectfully submit that there would be no motivation for the suggested combination of the Migdal reference with the Ghaem reference, the Juskey reference and the Hull reference, and that the cited references, alone or in combination, fail to teach or suggest all of the claim limitations. As such, it is respectfully submitted that the rejections of claims 20 through 22 under 35 U.S.C. § 103 be withdrawn. Claims 20 through 22 are believed to be in condition for allowance and such favorable action is respectfully requested.

- (E) Obviousness Rejection Based on U.S. Patent No. 6,046,910 to Ghaem et al. in View of U.S. Patent No. 5,264,061 to Juskey et al. and U.S. Patent No. 4,575,330 to Hull and Further in View of Japanese Patent No. 10189653 to Kuniaki

Claims 8, 13, and 46 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ghaem reference in view of the Juskey reference and the Hull reference, as applied to claims 1, 18, 19, and 41 above, and further in view of Japanese Patent No. 10189653 to Kuniaki (hereinafter the "Kuniaki reference"). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claims 8, 13 and 46 are believed to be in condition for allowance, among other reasons, as depending from one of claims 1 and 41, which are in condition for allowance. Additionally, it is respectfully submitted that the Examiner has failed to make out a *prima facie* case of obviousness of claims 8, 13 and 46 based upon the combination of references presented herein.

The Ghaem reference, Juskey reference and Hull reference are discussed hereinabove. The Kuniaki reference discloses a semiconductor element 3 that can be easily subjected to flip-chip mounting to a circuit board and is suitable for high-density mounting. A plurality of electrodes 7, which are to be directly bonded to the circuit board by way of solder balls 11 placed on top thereof, are arranged centrally in-line on semiconductor element 3 (see FIGs. 1-7). Auxiliary electrodes 10a-d having the same form and size as electrodes 7 are arranged at various locations on the element surface 4a. Support projections 12 on auxiliary electrodes 10a-d, which are solder balls having the same form and size as solder balls 11, come into contact with the circuit board upon positioning the semiconductor element 3, and prevent movement of the semiconductor element 3 along an axis extending through each of the solder balls on the center part of the element surface 4a (see Abstract, lines 12-19).

Applicants respectfully submit that there is no suggestion or motivation in the cited references or from the knowledge generally available in the prior art which would lead one of ordinary skill in the art to modify the Ghaem reference with the teachings of the Juskey reference, the Hull reference and the Kuniaki reference, as presented in the outstanding Office Action. First, as previously stated, there is no disclosure in the Hull reference describing forming parts for microelectronic devices or any description of forming parts which are secured or attached to other items not formed by stereolithography. The Hull reference envisions providing

prototypes by creating an entire assembly using stereolithography.

Regarding the Ghaem reference, as previously discussed, the polymeric preforms 40 are not for the purpose of stabilizing, but act as flow restrictors that prevent under-fill by polymeric bodies 50. This is evidenced by the fact that the polymeric preforms 40 are not necessary if the polymeric bodies 50 are viscous and will not substantially flow during application (see col. 8, lines 39-43). Even if the polymeric preforms 40 could be characterized as stabilizers, stereolithographically formed stabilizers would not reduce any risk of short circuiting in the Ghaem reference.

Additionally, the Kuniaki reference is relied upon for its disclosure of introducing encapsulating material between a flip chip die and a substrate. The Ghaem reference, on the other hand, envisions a microelectronic assembly which "eliminates the need for underfilling encapsulant . . ." (col. 2, lines 44-46). Accordingly, one of ordinary skill in the art would not be motivated to modify the Ghaem reference with the teachings of the Kuniaki reference, as presented in the outstanding Office Action.

Still further, the Ghaem reference teaches away from the asserted combination. The polymeric preforms 40 of the Ghaem reference are "preferably composed of a compressible material which does not significantly interfere with shrinkage of the polymeric bodies 50 during curing, cooling, or cross-linking" and, thus, which permit movement of an integrated circuit component 20 toward a substrate 40 (col. 6, lines 14-20). Stated another way, the polymeric preforms 40 of the Ghaem reference do not support the integrated circuit component 20. The polymeric preforms 40 are formed of a compressible material so that the polymeric bodies 50 can shrink and urge conductive members 32, 44 into contact with the terminals 48 (see col. 7, lines 15-19). This allows the conductive members 32, 44 to be slidable while maintaining good electrical contact. A rigid stereolithographically formed preform 40 would interfere with this type of electrical contact, and goes directly against the whole purpose of the Ghaem reference disclosure.

In view of the foregoing, applicants respectfully submit that the cited references fail to establish a *prima facie* case of obviousness of claims 8, 13 and 46. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 103 of claims 8, 13 and 46 based upon the Ghaem, Juskey, Hull and Kuniaki references be withdrawn. Each of claims 8, 13 and 46 are believed to be in condition for allowance and such favorable action is respectfully requested.

(F) Obviousness Rejection Based on U.S. Patent No. 6,046,910 to Ghaem et al. and Further in View of U.S. Patent No. 3,871,015 to Lin et al.

Claims 37 and 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ghaem reference, as applied to claim 36 above, and further in view of U.S. Patent No. 3,871,015 to Lin et al. (hereinafter the "Lin reference"). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claims 37 and 39 are both believed to be in condition for allowance, among other reasons, as depending, either directly or indirectly, from claim 36 (discussed hereinabove) which is in condition for allowance. It is respectfully submitted that there are additional reasons that claims 37 and 39 are in condition for allowance over the combination of the Ghaem reference, and the Lin reference as well.

The Ghaem reference is discussed hereinabove. The Lin reference discloses semiconductor modules having increased ability of at least some of the interconnection joints to withstand shear stress. The interconnection joints of the Lin reference are designed so that they are not all identical on the same chip. The differences, which may be differences in geometry or material, result in the connectors having different abilities to withstand stress (see col. 2, lines 33-46). Those joints having the lesser ability to withstand stress are positioned at points of relatively low stress or serve as dummy joints, *i.e.*, provide mechanical interconnection but not be connected to any active or passive element in the chip (see col. 4, lines 16-21).

It is respectfully submitted that a *prima facie* case of obviousness of claims 37 and 39 cannot be made based upon the cited references. First, neither the Ghaem reference nor the Lin

reference teach or suggest “at least one stabilizer structure to lengthen at least one of said conductive structures” as recited in claim 39. While the stabilizers of the Lin reference may differ from one another in geometry or material, such differences are for the purpose of attaining connectors having differing abilities to withstand stress. There is no teaching or suggestion in the Lin reference of a stabilizer structure for lengthening the conductive structures. As such, the asserted combination of references fails to teach or suggest each and every limitation of claim 39.

Further, one of ordinary skill in the art would not have been motivated to combine the teachings of the Ghaem and Lin references in the manner asserted. The Ghaem reference teaches preformed structures 40 that are placed on a substrate 46 or integrated circuit component 20 to restrict the flow of material into the area between substrate 46 and integrated circuit component 20 (see col. 5, line 66 – col. 6, line 13). The Lin reference, on the other hand, teaches interconnection joints of varying geometries but each formed of conductive materials, such as solder or copper, to vary the amount of stress resistance provided at various regions of the chip (col. 5, lines 30-45). The Lin reference does not teach or suggest a structure for restricting the flow of material between a substrate and an integrated circuit component as taught by the Ghaem reference. Nor does the Ghaem reference teach or suggest the formation of interconnection joints having varying stress resistance.

Additionally, the polymeric preforms 40 of the Ghaem reference are “preferably composed of a compressible material which does not significantly interfere with shrinkage of the polymeric bodies 50 during curing, cooling, or cross-linking” and, thus, which permits movement of an integrated circuit component 20 toward a substrate 40 (col. 6, lines 14-20). The interconnection joints of the Lin reference, on the other hand, are formed of rigid materials, such as solder or copper, which are capable of fracture rather than compression if enough stress is provided (col. 3, line 56 – col. 4, line 5). Accordingly, one of ordinary skill in the art would not have been motivated to use the interconnection joints of the Lin reference in the method of the Ghaem reference as asserted in the outstanding Office Action. Accordingly, it is respectfully submitted that one of ordinary skill in the art would not be motivated to combine the teachings of

the Ghaem and Lin references in the manner asserted.

As such, applicants respectfully submit that the cited references fail to establish a *prima facie* case of obviousness of claims 37 and 39. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 103 of claims 37 and 39 be withdrawn. Each of claims 37 and 39 are believed to be in condition for allowance and such favorable action is respectfully requested.

Drawings

Applicants will file corrected formal drawings upon receipt of a Notice of Allowance and Issue Fee Due in the application.

CONCLUSION

Claims 1 through 23 and 36 through 49 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact applicants' undersigned attorney.

Respectfully Submitted,



Brick G. Power
Registration Number 38,581
Attorney for Applicants
TRASKBRITT, PC
P.O. Box 2550
Salt Lake City, Utah 84110
Telephone: (801) 532-1922

BGP/ps:djp
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Enclosure: Version of Replacement Title & Paragraph with Markings to Show Changes Made

**VERSION OF REPLACEMENT TITLE & PARAGRAPH OF SPECIFICATION WITH
MARKINGS TO SHOW CHANGES MADE**

The title of the invention has been amended as follows:

**STEREOLITHOGRAPHIC METHOD ~~AND APPARATUS~~ FOR FABRICATING
STABILIZERS FOR FLIP-CHIP TYPE SEMICONDUCTOR DEVICES ~~AND RESULTING~~
~~STRUCTURES~~**

Specification paragraph [0009] has been amended as follows:

[0009] As noted previously and illustrated in FIG. 3, ~~since~~ bond pads 202 are arranged on active solder bumps ~~30, 30A, 30B~~ 220 secured to bond pads ~~122~~ 202. Alternatively, the conductive structures may be any other known type of conductive structure, suitably configured as balls, bumps, or pillars. The conductive structures can be formed from any type of conductive material or combination of materials known to be useful as a conductive structure of a semiconductor device, including, without limitation, solders, other metals, metal alloys, conductive epoxies, conductor filled epoxies, and z-axis conductive elements.